

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of	:	Customer Number: 46320
	:	
Michel BETANCOURT	:	Confirmation Number: 5912
	:	
Application No.: 10/675,181	:	Group Art Unit: 2185
	:	
Filed: September 30, 2003	:	Examiner: Y. Campos
	:	
For:		AUTONOMIC MEMORY LEAK DETECTION AND REMEDIATION

REPLY BRIEF

Mail Stop Appeal Brief - Patents
Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply Brief is submitted under 37 C.F.R. § 41.41 in response to the EXAMINER'S ANSWER dated April 19, 2007.

The Examiner's response to Appellant's arguments submitted in the Appeal Brief of December 26, 2006, raises additional issues and underscores the factual and legal shortcomings in the Examiner's rejections. In response, Appellant relies upon the arguments presented in the Appeal Brief of December 26, 2006, and the arguments set forth below.

Claims 6 and 13

In response to Appellant's arguments on page 4 and 5 of the Appeal Brief, the Examiner asserted the following on page 20 of the Examiner's Answer:

Appellant should note that utilization of a memory segment occurs when executing processes reference/use a memory segment: In response to changes in utilization, segments are moved to different "age-queue buckets" wherein each "age-queue bucket" comprises a different age/aging value since the memory segment has been used/referenced by an executing process. (emphasis added)

Appellant respectfully submits that the Examiner has mischaracterized the teachings of the Menon. The claimed limitation at issue is "resetting said aging value when said object instance is referenced by an executing process," and the Examiner is apparently trying assert that the change in "utilization" corresponds to the claimed "referenced by an executing process." In this regard, reference is made to column 8, lines 15-34 of Menon:

At any time, the utilization of a segment is the fraction of the segment containing live tracks. Thus, if a segment contains L live tracks and if the segment capacity is C tracks, then the utilization of the segment is given by

$$\text{Utilization} = L/C.$$

The writing process described immediately above will eventually deplete the empty segments in the DASD array 106. Therefore, a garbage collection process (described further below) is performed to create empty segments. Garbage collection is carried out by choosing a certain number of partially-filled target segments in DASD and compacting the live tracks in these segments into a fewer number of full segments, thereby creating empty segments. For example, if garbage collection is performed on three partially empty segments, and each has a 2/3 utilization rate, then the live tracks can be collected and reorganized into two full segments and one completely empty segment that is ready to receive data from the LSA input write buffer 128. Thus, a net increase of one empty segment is created by the garbage collection process.

Further reference is made to column 11, lines 18-21:

Utilization u was defined above to be the fraction of live space in the segment, so that (1-u) is defined to be the fraction of free space in the segment, also called the "dead" fraction.

As evident from the above passages, the change in "utilization" disclosed by Menon is not based upon an "object instance [being] referenced by an executing process." Instead, Menon discloses utilization as being "the fraction of live space in the segment." Therefore, the subsequent analysis on pages 20-21 of the Examiner's Analysis is based upon a mischaracterization of the teachings of Menon.

For example, the Examiner further asserted the following on page 20 of the Examiner's

Answer:

Menon selects segments for garbage collection from the least-used (lowest utilization range or lowest numbered) "age queue bucket." When a segment from the lowest numbered age-queue bucket is referenced by an executing process, its utilization changes and this segment is moved from this lowest numbered age-queue bucket (*which represents a bucket having the oldest/highest age value since a process has referenced/used its contents*) to a higher numbered bucket (*which represents a bucket having a smaller age value since a process has referenced/used its contents*). (underlined emphasis added, italics in original)

Referring to the underlined portion above, the Examiner has made an improper conclusion.

Menon teaches that utilization changes as the fraction of live space in a segment changes. With regard "live" data, reference is made to column 3, lines 26-40 of Menon:

A block that contains data values for which there have been later write operations, meaning that the data values have been superseded, is available for recording new data. As noted above, such superseded data is referred to as garbage (or "dead") and the corresponding disk area is referred to as a garbage block. A block containing data values that have not been superseded contains valid data and is referred to as a clean block or a live block. After a number of data modifying write operations have been carried out in disk drive units forming a log structured array, there likely will be at least one segment's worth of garbage blocks scattered throughout the array. By consolidating live blocks with valid data, a fully empty segment can be created, which will then be available for receiving new (live) data values from the input write buffer.

Based upon Menon's teachings, "live" data is new/updated data (see also column 1, lines 48-51 of Menon). Thus, whether or not data is live is not relevant to whether or not an "object instance is referenced by an executing process" since referring to an object instance does not change whether or not data is live or dead. Thus, "a segment ... [being] referenced by an executing process," as asserted by the Examiner, does not lead to the utilization being changed.

The Examiner further asserted the following on pages 20-21 of the Examiner's Answer:

Therefore, as a memory segment is moved from one age-queue bucket to another in response to changes in utilization, the utilization value or age value since that segment has been referenced by an executing process is changed; therefore, it is reset. When a segment is selected for garbage collection, it is selected from the lower numbered age-queue bucket (which represents a bucket having the oldest/highest age value since a process has referenced/used its contents). Menon, in

essence, resets the age of a segment for garbage collection, achieving the functionality of "resetting said aging value when said object instance is referenced by an executing process."
(emphasis added)

Referring to Appellant's arguments spanning pages 5 and 6 of the Appeal Brief and the underlined portion above, the Examiner is improperly trying to assert the teachings of Menon are equivalent to the claimed invention instead of establishing that all the limitations of the claimed invention are identically disclosed by Menon.

The Examiner arguments on pages 21 and 22 again rely on the improper characterization of Menon that "[u]tilization of a memory segment occurs when executing processes reference/use a memory segment."

On page 22 of the Examiner's Answer, the Examiner further asserted the following:

Furthermore, the Examiner would like to respectfully submit that the claims do not contain any requirement/limitation dictating how the resetting process occurs or adding any details to the claimed "resetting."

Notwithstanding the Examiner failing to explain why this assertion is relevant to the Examiner's arguments, the term "resetting," given its ordinary and customary interpretation by one having ordinary skill in the art, requires that the aging value must first be "set" before being "reset."

In response to Appellant's arguments on page 5 and 6 of the Appeal Brief, the Examiner asserted the following on page 23 of the Examiner's Answer:

Therefore, for every garbage collection pass when a segment is not filled by write operations, the segment's age must be incremented in order for the segment to be able to wait to reach an age threshold since this segment has not been filled by write operations and be considered for garbage collection. Menon discloses that segments are not considered for garbage collection until they

reach an age threshold since they have been filled by write operations; therefore, Menon discloses "incrementing said aging value during a garbage collection pass when said object instance had not been referenced by an executing process since a previous garbage collection pass" as required by the claims. (emphasis added)

The claim limitation at issue is "incrementing said aging value during a garbage collection pass when said object instance had not been referenced by an executing process since a previous garbage collection pass" (emphasis added). The Examiner is relying upon the teaching of "write operations" as corresponding to an object instance not being referenced. As known by those skilled in the art, referencing an object in memory is commonly known as a "read" operation. The Examiner, however, is relying upon the teachings of "write" operations. A write operation and a read operation, however, are fundamentally different. A data object is created in memory by a write operation. Once the data object is within the memory, the data object is accessed by a read operation. Thus, the Examiner is relying upon teachings (i.e., write operations) that are not comparable to the claimed limitations (i.e., reference the object instance).

On pages 23 and 24 of the Examiner's Answer, the Examiner addressed Appellant's prior arguments with regard to the Examiner's use of "equivalency" to establish that Menon discloses a particular limitation. Despite these arguments by the Examiner, the Examiner has failed to address the gist of Appellant's arguments. Specifically, Appellant argued that the Examiner was relying upon equivalency (i.e., a feature that is different than the claimed invention but performs the same function) instead of establishing that Menon identically discloses the claimed limitation.

Claim 1

In response to Appellant's arguments on page 4 and 5 of the Appeal Brief, the Examiner asserted the following on pages 25 and 26 of the Examiner's Answer:

A class is a set, collection, group, or configuration containing members regarded as having certain attributes in common; a kind or category. Applicant should note that all memory cells marked in black in Ozawa comprise a listing/class/configuration of elements having an attribute in common, that all memory cells marked in off-white in Ozawa also comprise a listing/class/configuration of elements having an attribute in common and in the same manner, all the white cells comprise a listing/class/configuration of elements having an attribute in common. In this case, the attribute in common comprises the color classifications of these cells/objects. Accordingly, since all cells/objects classified with the black or off-white colors will not be garbage collected during a sweep phase, these classes of cells are exempt being collected during a garbage collection cycle.

The Examiner appears to be confusing the concept described regarding genus-species situation in M.P.E.P. § 2131.02 with how a teaching of a reference can be interpreted with regard to a rejection based upon 35 U.S.C. § 103. In the first instance, a very specific disclosure (i.e., the species) within the applied prior art is capable of identically disclosing, within the meaning of 35 U.S.C. § 102, a claimed generic feature (i.e., the genus). However, although the specific disclosure meets the requirements of 35 U.S.C. § 102 in identically disclosing the generic feature, this specific disclosure does not teach the genus.

To analogize the difference, as an example, the disclosure of using a statin to lower the cholesterol within a mouse, is sufficient to identically disclose a claim directed to using a hypolipidemic agent in mammals to lower cholesterol, since a statin is a class of hypolipidemic agents and a mouse is a species of the genus mammals. However, it cannot be said that the disclosure of using a statin to lower the cholesterol within a mouse teaches the broad suggestion of using hypolipidemic agents in mammals to lower cholesterol. To do so would be improperly synthesize a teaching from the prior art that one having ordinary skill in the art at the time of the invention would not recognize the prior art as actually teaching.

Ozawa does not teach the broad concept of classes that are exempt. Instead, Ozawa is limited to teaching marking a cell with black to indicate that the cells "cannot be judged to be 'garbage.'"

With regard to Appellant's argument that the Examiner has failed to establish that Ozawa fails to teach a plurality of exempt classes, the Examiner asserted the following:

Therefore, since only white cells are garbage collected, Ozawa discloses at least two classes of cells that are exempt from garbage collection; thereby disclosing a garbage collection tracing policy comprising "a listing of exempt classes based upon which object instances are exempted from being labeled loiterer."

The Examiner is again taking liberties with the teachings of the applied prior art. Ozawa teaches 3 colors of cells: white, black, and off-white. Black cells are exempt from collection and white cells are collected. Thus, the Examiner must be asserting that off-white cells are also exempt from collection. The Examiner's cited passage of paragraph [0153] states that "a special process described later must be performed" as to off-white cells. In this regard, reference is made to paragraph [0180] of Ozawa:

In S164, it is judged whether the cell pointed to by variable i does not correspond to a free cell and simultaneously it is judged whether the color field of the cell is off-white. In S165, only the color fields of cells, the judgment results of which are Yes, are turned white. Taking into consideration the combination of this judgment process in S164 and the judgment process in S162 described earlier, in this case, cells, the color fields of which are marked black, remain black. Since the cells, the marks of which remain black, are excluded from the targets of the mark phase process, the number of the cells to be marked decreases, when the mark process shown in FIG. 10 is executed in S110 shown in FIG. 8.

As described above, in step S164 of Fig. 11, if the cell is off-white and "variable i does not correspond to a free cell," then the cell is turned white. Since, as described above, white cells are collected (not exempt from collection), and since off-white cells are subject to a special process that can turn the cells into a white cell, then off-white cells are not an exempt class.

Appellant's also note that "off-white cells" are not an exempt class of object instances that are exempt from being labeled as loiters, as claimed. In this regard, reference is made to paragraph [0145]. As described therein, free cells (i.e., cells that do not contain an object) are "turned off-white." As described in paragraph [0178], "since in S171 a cell pointed to by variable i is managed as a free cell, the color field of the cell is turned off-white." Thus, this paragraph further confirms that a free cell is marked as off-white. Moreover, as described in the above-reproduced paragraph [0180], a cell that is both off-white and not "free" is turned white.

The teachings of Ozawa are clear that cells labeled with off-white are free and, thus, do not include an object instance. Even if an off-white cell could be considered a "class," it does not correspond to one of the claimed "exempt classes based upon which object instances are exempted from being labeled loiterers." Therefore, only the black cells could be considered a exempt class, and thus, Ozawa only discloses a single class and fails to teaching the limitations for which the Examiner is relying upon Ozawa to teach.

For the reasons set forth in the Appeal Brief of December 26, 2006, and for those set forth herein, Appellant respectfully solicits the Honorable Board to reverse the Examiner's rejections under 35 U.S.C. §§ 102, 103.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

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including extension of time fees, to Deposit Account 09-0461, and please credit any excess fees to such deposit account.

Date: June 18, 2007

Respectfully submitted,

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